8. CERAMIC ANALYSIS

INTRODUCTION

In this and the following chapter the characteristics of Neuse Levee ceramics and lithics are examined. This is done in each technological domain through a series of tables that lay out the relationships between attributes and vertical depth from the surface. After these one-dimensional issues have been examined, attributes are evaluated in aggregate by a multidimensional model that allows interaction of the properties of technologies, time, and sites in the Neuse Fall Line region.

As might be expected in a Fall Line situation, the ceramics from Neuse Levee (31WA1137) demonstrate influences from both the Piedmont and Coastal Plain. Some of the ceramics conform to descriptions of the Yadkin series previously described in North Carolina and the surrounding regions (Anderson 1996; Coe 1964; Espenshade 1986; Marshall 1988). Others resemble more the Deep Creek and Mount Pleasant series from the Coastal Plain (Phelps 1983). The intermediate location of the site between the Coastal Plain and Piedmont makes the assemblage an interesting study in two technologically similar but apparently functionally different types. Comparative materials were excavated at three Early Woodland-period sites (31WA1376, 31WA1390, and 31WA1380) on Wakefield Creek, which contained exclusively Yadkin series pottery. Yadkin ceramics bear mostly fabric-impressed surface treatments and are frequently tempered with crushed quartz, a technology that endures in variant forms from the Early to Late Woodland periods. A small number of Neuse Levee sherds from the Early Woodland levels were net-impressed.

In this chapter the characteristics of the Yadkin, Deep Creek, and Mount Pleasant ceramics are reviewed. The attributes of the Neuse Levee ceramics are analyzed relative to trait complexes and vertical distributions in the site. The findings are compared with the Wakefield sites, for which a comparable data set is available.

REGIONAL CERAMICS SURVEY

Yadkin Series

Coe (1964) described a ceramic chronological sequence, in which pottery of the Yadkin series is characterized by crushed quartz temper, fabric-impressed and cord-marked surface treatments, and smoothed interiors. In Coe's sequence the Yadkin series was preceded by the Badin series, which is similar to Yadkin pottery but tempered with fine sand (Coe 1964:28–30). Based on stratigraphic succession at the Doerschuk site (31MG22), Coe assigned Badin to the Early Woodland and Yadkin to the Middle Woodland period (A.D. 600–1000). More recent research has modified the temporal range of the series and outlooks of the relationship of the two technologies. For example, Yadkin series pottery has been recovered from the earliest Early Woodland sites in the North Carolina Piedmont (see below). Badin pottery has proven to be rather uncommon compared to Yadkin pottery in the Piedmont, although difficulty in applying the type as it was originally defined has complicated the issue.

It seems likely that Badin and Yadkin as they are defined are better thought of as different technological nodes within the same cultural system, with the differential occurrence of attributes (crushed quartz vs. fine sand) explained by long-term shifts in technology in response to changing environmental and subsistence conditions. These shifts were not directional but oscillated between poles of the technological continuum (Idol 1998; Lilly and Gunn 1996). Such an oscillation might be present at Neuse Levee (see below). What seems clear is that one cannot define a clear break between Early and Middle Woodland periods solely on the basis of ceramic sherds. Late Yadkin pottery (as at the Town Creek site [Coe 1995:154]) may persist into the Late Woodland, and typologically blends with subsequent early Uwharrie pottery. Thus, the attributes that comprise Badin/Yadkin pottery are an important source of variation for further study, rather than type/index "fossils" whose chronological position is inviolable (Badin does precede Yadkin at Doerschuk, but that represents just one variation out of many that are possible). At any rate, the Early Woodland as commonly defined in Piedmont North Carolina encompasses an extensive time span (ca. 500 B.C.–A.D. 500/600), and local variation in ceramic attributes is expectable due to localized time/energy constraints and subsistence needs (Table 8.1).

Dates associated with Yadkin series pottery from 38SU83 in Sumter County, South Carolina, are 180±70 B.C. for Yadkin cord-marked and 380±80 B.C. and 520±70 B.C. for Yadkin simple-stamped and check-stamped from an associated ceramic feature (Blanton et al. 1986: 146–147). Claggett and Cable (1982) report an uncalibrated date of 240±95 B.C. associated with Yadkin fabric-impressed and cord-marked ceramics from 31CH8. The earliest reported associated date for the Yadkin series in the northwest central Piedmont comes from the E. Davis site (31FY549), where charcoal from a rock-filled pit containing Yadkin fabric-impressed pottery yielded an uncalibrated date of 220±80 B.C. (Davis 1987). Herbert (1997:12) points out that the Yadkin series linear check-stamped minority ware observed at Doerschuk could be related to the southern sand-tempered and linear check-stamped Deptford series (500 B.C.–A.D. 500), which is found as far north in the Coastal Plain as New Hanover County.

Table 8.1. Time Distribution of Yadkin Exterior Surface Decoration.

Date (B.C.)	Cord	Fabric	Stamped
100			
200	XX	XX	
300			
400			X
500			X

Deep Creek–Mount Pleasant

The Yadkin series resembles the Middle Woodland Onslow and Mount Pleasant series in the North Carolina Coastal Plain (Anderson 1995:272), although Late Middle Woodland as well as Early Woodland dates have been reported for this material. Herbert (1997:11–18) has launched a long-term project to date Coastal Plain ceramics, supplementing the usual radiocarbon method with direct dating of sherds by thermoluminescence (TL). Several new dates by both TL and radiocarbon methods are allowing refinements of the Coastal Plain pottery chronology. In the third and second millennium B.C., in the Terminal Archaic, fiber-tempered Stalling series and sand-tempered Thoms Creek ceramics spread from the Savannah River northward along the coastal zone as far as the Virginia boarder; Thoms Creek is seldom found beyond the Cape Fear River. At a later date (1200–800 B.C.) the soapstone-tempered Marcey Creek series and grog-tempered Croaker Landing series appeared around Chesapeake Bay. Marcey Creek is found occasionally as far south as the southern North Carolina Coastal Plain, while Croaker Landing is confined north of Albemarle Sound. The limestone/marl-tempered Hamps Landing series has recently been defined in the lower Cape Fear River, with a comparable Wando series in northern South Carolina. Dates range from the late third millennium into the early second millennium (Abbott et al. 1998).

Pertinent to the Neuse Levee ceramics are the Early Woodland series, which appear in the first millennium B.C. The Neuse River frequently forms a permeable boundary between the northern and southern Coastal Plain, apparently because of the differences in habitat to the north (embayed, according to Mathis [1998] and Phelps [1983]) and south (steeper coastal zone and continental shelf). On the southern Coastal Plain, thin (6–8 mm), coarse, sand-tempered New River series and fine sand Cape Fear series ceramics date to the first millennium B.C., although Cape Fear dates may be extended to much later (Herbert 1997:38–39). New River surface treatments, in declining order of dominance, were cord, fabric, plan, simple-stamped, and net. North of the Neuse River the thick (>10 mm), coarse sand–tempered Deep Creek series (2000–300 B.C.) (equivalent to New River) appears in cord-marked, fabric-impressed, simple-stamped, and net-impressed variants. Deep Creek ceramics are found with Gypsy points (Phelps 1983:31). Three Deep Creek subperiods were distinguished by Phelps (1983:31) based on the transitional predominance of cord marking to simple stamping. The sand temper is said to be "sandy to the touch," (equivalent to unsmoothed/roughly smoothed in Neuse Levee codes) (Loftfield 1976:149). The only radiocarbon date on Deep Creek is from a net-impressed vessel recovered from under a wooden canoe in Lake Phelps: 900±60 B.C. radiocarbon (1120 B.C. calibrated) (Herbert 1997:37). A TL date of 1221±436 B.C. obtained on a coarse sand–tempered cord-marked Deep Creek sherd confirms the radiocarbon date on the series. These dates could well indicated the age of the net-impressed wares from Neuse Levee.

On the Coastal Plain, Middle Woodland (200 B.C.–A.D. 900) evolves around a more dispersed settlement pattern of smaller sites than in the Early or Late Woodland (Herbert 1997:13), and is accompanied by the appearance of conical-based jars suggesting cooking of food (Herbert 1997:14). Low sand mounds containing burials (see prehistoric background) also figure into this pattern. In the south, Deep Creek temper shifts from coarse to medium sand, and simple stamping is expanded to include cord-, fabric-, and net-wrapped paddling. Sand-tempered Cape Fear shares the southern Coastal Plain with grog-tempered Hanover series (200 B.C.–A.D. 500); new results suggest Cape Fear could extend into Late Woodland, or perhaps not exist in the Middle Woodland. In the Late Woodland [Herbert 1997:29–32]) a complementary pattern of cord and fabric impression appears between Hanover and Cape Fear (Herbert 1997:14). In the north, sand- and grit-tempered Mount Pleasant series (200 B.C.–A.D. 500, perhaps to Late Woodland as with Cape Fear) ceramics acquire an enlarged granule and pebble component in temper. The Mount Pleasant series bears ill-defined relationships to Cape Fear, Vincent, and Stoney Creek (Herbert 1997:16). (Because of the sand-to-grit sequence in the Neuse Levee ceramics, Mount Pleasant seems the best fit for the Neuse Levee ceramics, discussed below.) The shell-tempered Mockley series (A.D. 200–900) appears on the northern Coastal Plain and has a net-impressed variant along with cord marking.

The Late Woodland (A.D. 900–1600) settlement pattern on the Coastal Plain aggregated into large villages, hamlets, and seasonal camps, with large sites where agriculture, hunting and gathering, and fishing could all be practiced. Shell-tempered Collington series is found in the Coastal Zone. In the Coastal Plain appear sand and pebble Cashie series (A.D. 800–1650) with fabric-impressed, simple-stamped, incised, and plain variants. Pebbles sometimes are large enough to protrude from both the interior and exterior aspects of vessels. The series is thought to be related to Roanoke-area Gaston simple-stamped and Virginia Branchville and Sturgeon Head series.

Further afield, the Yadkin series also resembles the fabric-marked and cord-marked quartz-tempered Dunlap series to the southwest of the study area in Georgia and the Swannanoa series in the Appalachian Summit region, which is associated with much earlier dates than those obtained in the North and South Carolina Piedmont (Eastman 1994:59). It is difficult to distinguish the Yadkin series from the Vincent and Clements series in Coe's (1964:101–104) published description.

Net-Impressed

Twelve sherds of net-impressed ceramic were found at Neuse Levee. Net-impressed wares are prominently featured in the Early Woodland assemblages in the Chesapeake Bay region and occasionally appear in other regions at other time periods to the south as far as the Savannah River (Table 8.2). Around Chesapeake Bay Egloff and Potter (1982) report that net impressions appear on generally coiled ceramics with shell- or sand-tempered "flat bottom jars" (700±100 B.C.; Egloff and Potter 1982:97), ferruginous sand-tempered Popes Creek Net-Impressed (350±150 B.C.; Egloff and Potter 1982:99), pebble- (2–12 mm) tempered Prince George knotted net ware (350±150 B.C.; Egloff and Potter

1982:103), shell-tempered Mockley Net-Impressed (550±350 B.C.; Egloff and Potter 1982:103), and Potts Net-Impressed (Mockley Net-Impressed; Egloff and Potter 1982:107). The crushed-quartz– and sand-tempered Stoney Creek ware has net impressions (500±300 B.C.; Egloff and Potter 1982:99) and is cross-referenced with Vincent and Clements (Coe 1964).

Table 8.2. Time-Province Distribution of Net-Impressed Ceramics.

	Virginia	Northern Coastal Plain	Southern Coastal Plain
Late Woodland	X		
Middle Woodland		X	
Early Woodland	X	X	

No net-impressed variants are reported for the round quartz- (2-mm) tempered Nomini ware (A.D. 800±100; Egloff and Potter 1982:105–106; it resembles Mockley net-impressed but has no knots), crushed-granite– and gneiss-tempered Hercules ware (A.D. 550±350), fine crushed-shell–tempered Townsend (Rappahanock) ware (A.D. 1300±300; Egloff and Potter 1982:109), pebble- (2–5 mm) tempered Cashie ware (A.D. 1300±150; Egloff and Potter 1982:109), subangular quartz- (2–5 mm) tempered Gaston ware (ca. A.D. 1700), shell tempered Roanoke ware (A.D. 1200±400; Egloff and Potter 1982:109; Phelps' [1981] Colington series), crushed-quartz–tempered Potomac Creek ware (A.D. 1450±150; Egloff and Potter 1982:112), micaceous sand mixed with crushed-quartz–tempered Moyanone ware (1450±150; Egloff and Potter 1982:112), shell-tempered Yeocomico ware (1550±50; Egloff and Potter 1982:114), untempered Camden ware (ca. A.D. 1660; Egloff and Potter 1982:114), silt-tempered Curtland ware (A.D. 1610±50; Egloff and Potter 1982:114), or Colono ware (A.D. 1620±50; Egloff and Potter 1982:114).

As in the Chesapeake Bay region, net impression did not survive into the Late Woodland period on the Coastal Plain of North Carolina (Phelps 1983:36), nor did it precede the Late Archaic Stallings, Thoms Creek, or Marcey Creek ceramics. The Stallings–Thoms Creek wares extend north to the Neuse River in the Coastal Plain, and a few northern-originating Marcey Creek sherds are found north of the Neuse River in North Carolina (Phelps 1983:29). Net impression was a prominent feature of the Early Woodland (>1000–800 B.C.), and Middle Woodland (800 B.C.–A.D. 200) Deep Creek I ceramics have some net impression. However, Deep Creek II (800 B.C.–A.D. 200) appeared with an increase in net impression (Phelps 1983:31), which continued through Middle Woodland (A.D. 200–800) Deep Creek III. From the Deep Creek series the technique was passed on to the Late Woodland Mount Pleasant series. Mount Pleasant is characterized by highly varied temper, including sand, grit, and pebbles (Phelps 1982:32), and possibly a greater frequency of net impression. As in the Middle Atlantic Coastal Plain, net impression disappears in the Late Woodland. Contrary to this trend, the Late Woodland Dan River Phase in the Piedmont continues net impression as a majority surface treatment (Ward 1983:76).

Along the Coastal Plain, both fabric and net impression decline in frequency to the south and disappear altogether north of the Savannah River (Phelps 1983:31). In the Piedmont, at Doerschuk, Coe (1964:29) reports 246 net-impressed sherds, and 161 more from one Dan River pot. He dates Dan River Net-Impressed to A.D. 1650 and Uwharrie Net-Impressed to A.D. 1500. Oddly, Coe did not report net-impressed ware from the Gaston site.

To summarize, net impression clearly has its focus around the Chesapeake Bay area during the Early Woodland, with a diminishing frequency toward the south. In fact, the lower Neuse River is considered a cultural boundary as early as the Early Woodland (Phelps 1983). Net impression also appears as an important Piedmont decorative technique in the very Late Woodland on the upper Dan River (Davis 1987; Ward 1983). That the Neuse Levee net-impressed ware occurs with an Eared Yadkin (ca. 500 B.C.), two large triangular, and two small triangular points, suggests that it is of Early Woodland vintage. It is stratified above a very Early Woodland Gypsy. Fabric impressions trend from fine fabric, apparently again in the Early Woodland, to coarse in the Late Woodland (dated because of a predominance of Small Triangulars), although a large triangular was also found in the plowzone.

Although typological concordance between Piedmont and Coastal Plain researchers is desirable, it is equally important to focus on the various roles performed by ceramics within cultural systems. The methods used to analyze sherds are discussed in the methods chapter.

NEUSE LEVEE CERAMICS

At Neuse Levee 199 sherds and sherdlets (<2 cm) were recovered during Phase III investigations. Of these, 105 (77 body, 24 rim, 4 base) were greater than 2 cm in diameter and were therefore subjected to further analysis (Table 8.3). Exterior surface treatments include fabric-impressed or fabric-smoothed (n=76, 72%) and a few unidentifiable treatments (n=17, 16%); no cord-marked specimens were recovered, but a dozen net-impressed (n=12, 11%) sherds were found together in the same level (E126 N190 S2.3 [33–43 cmbs]). Although they are treated as fabric-impressed in the following analyses, two heavily smoothed sherds could be net-impressed (see Figure 6.5e, f). They are important because they are not in the same unit as the dozen net-impressed sherds (e=E123 N95 S2.1 [20–30 cmbs], f=E126 N100 S2.1 [20–40 cmbs]). As such they suggest that the group of net-impressed sherds was not an isolated and possibly intrusive assemblage.

As is shown in Table 8.3, no significant relationship was detected between exterior treatment and vessel portion. A chi-square value probability of .908 indicates a completely random relationship between vessel portion and exterior treatment. This is in spite of a high proportion of vessel lips preserved (n=24, 22.9%), about twice as many as at the Wakefield Creek sites. Exterior treatment is frequently described as varying from one portion of a vessel to another (e.g., Davis 1987). At least relative to the exterior treatment attribute of the Neuse Levee ceramic assemblage, there is no reason to suspect that the analysis of exterior treatment is biased by over-representation of one or another portion of the vessels. It also suggests that the vessels were treated up to the lip in the same manner as on the body.

Except for the net-impressed and smoothed sherds, Neuse Levee ceramics are fabric-impressed (see Table 8.3). The fabric-impressed categories can be broken down further by subcategories. Fabric-impressed sherds were predominately fine Fabric III (n=28) or Fabric IV (n=25), although Fabric II (n=17) is relatively well represented. Similar to the Wakefield sites, the proportion of fine fabric (FIII+FVI) dominates the assemblage (n=52, 69.3%) of fabric-impressed sherds, although to a greater degree than at those sites (31WA1376, 54.2%; 31WA1390, 53.8%; 31WA1380, 57.1%).

A relatively clear time trend appears in the vertical distribution of ceramics (Table 8.4). The net-impressed ware is deep in the upper part of Stratum 2 and associated with a Gypsy point and Large Triangular points. Although coarse fabric-impressed ware appears occasionally throughout the vertical distribution, fine fabric patterns are clearly concentrated in the lower part of stratum 1.

Sherds were predominately tempered with <2-mm-sized angular or subangular quartz (n=68; 65%, Table 8.5). A smaller proportion of very coarse to coarse quartz (>2 mm) angular or subangular quartz (n=32; 31%) comprise most of the remainder of the assemblage. No apparent relationship was found between the angularity of the grains and temper size (p=.201), perhaps a function of the domination of the temper by essentially sand-size temper. Within the >2-mm-size range column, the observed values do shift from slightly less than to greater than expected values as angular crushed quartz becomes prevalent. This is as would be anticipated if large fragments of crushed quartz were selected for the tempering agent, leaving out the smaller fragments.

Table 8.3. Exterior Treatment x Vessel Portion Cross-Tabulation, Expected Values.

Exterior	Treatment		Vessel Portion				
			base	body + base	body	rim + lip	Total
FI	fabric r/visible warp	Count	0	0	5	1	6
		Expected	0.1	0.1	4.4	1.4	6
FII	fabric r/no visible warp	Count	0	0	14	3	17
		Expected	0.3	0.3	12.4	3.9	17
FIII	fabric f/visible warp	Count	0	0	19	9	28
		Expected	0.5	0.5	19.7	6.2	28
FIV	fabric f/no visible warp	Count	1	1	18	5	25
		Expected	0.5	0.5	18.3	5.8	25
	fabric smoothed	Count	0	0	1	0	1
		Expected	0	0	0.7	0.2	1
	uid r/smoothed	Count	1	1	11	1	14
		Expected	0.3	0.3	10.2	3.2	14
	uid	Count	0	0	1	1	2
		Expected	0	0	1.5	0.5	2
	net	Count	0	0	8	4	12
		Expected	0.2	0.2	8.8	2.8	12
Total		Count	2	2	77	24	105
		Expected	2	2	77	24	105

Chi-square=13.0, df=21, p=.908.

Table 8.4. Strata x Exterior Treatment Cross-Tabulation, Transformed.

Strata	Depth (cm)		Exterior Treatment				Associations
			Coarse Fabric	Fine Fabric	Net	Total	(st=small triangular, lt=large tri.)
1.10–1.20	0–10	Count	8	14	0	22	st st
(Plowzone)		Expected	5.8	13.3	3	22	
1.30–1.40	10–15	Count	6	3	0	9	st st lt
		Expected	2.4	5.4	1.2	9	Coarse Fabric
2.1	15–20	Count	3	31	0	34	Fine Fabric
		Expected	8.9	20.5	4.6	34	
2.2	20–25	Count	6	3	0	9	st st st
		Expected	2.4	5.4	1.2	9	
2.30–3.2	25+	Count	0	2	12	14	lt lt st st Net (33–43 cmbs)
	55–65	Expected	3.7	8.4	1.9	14	Gypsy (55–65 cmbs)
Total		Count	23	53	12	88	
		Expected	23	53	12	88	

Chi-square=95.7, df=8, p<.0001.

Sherd thicknesses ranged from 3.0 to 12 mm (mean=7.31 mm; SD=1.43) (Table 8.6), which places the majority of sherds in the sherd thickness range of coarse sand–tempered New River (6–8 mm), while a few sherds are in the >10-mm Deep Creek range. The majority of temper size observations is coarse to very coarse (>.50–2.00 mm) (n=64; 61.0%), with the grit in the granule category and into the still-larger pebble range.

Table 8.5. Temper Shape x Temper Size Cross-Tabulation, Transformed.

Temper Shape		Temper Size (mm)		
		<2.00	>2.00	Total
angular	Count	24	17	41
	Expected	28.1	12.9	41
subangular	Count	44	15	59
	Expected	40.5	18.5	59
subrounded	Count	4	1	5
	Expected	3.4	1.6	5
Total	Count	72	33	105
	Expected	72	33	105

Chi-square=3.2, df=2, p=.201.

Table 8.6. Maximum Sherd Thickness x Temper Size Cross-Tabulation.

Thickness (mm)		Temper Size (mm)				
		<.25–.50 f./medium	.50–2.00 coarse/v.c.	2.00–4.00 granule	<4.00 pebble	Total
<5.00	Count	2	5	0	0	7
	Expected	.5	4.3	1.5	.7	7
6.00	Count	2	14	4	1	21
	Expected	1.6	12.8	4.6	2.0	21
7.00	Count	1	24	7	4	36
	Expected	2.7	21.9	7.9	3.4	36
8.00	Count	1	13	8	1	23
	Expected	1.8	14.0	5.0	2.2	23
>9.00	Count	2	8	4	4	18
	Expected	1.4	11.0	3.9	1.7	18
Total	Count	8	64	23	10	105
	Expected	8.0	64.0	23.0	10.0	105

Chi-square=15.572, df=12, p=.212.

One of the hypotheses of interest to this analysis is that temper is pre-selected by size of the intended vessel (see Chapter 4, research design). To test this hypothesis, the cell sizes were augmented by reducing the number of states in each variable to two. This was accomplished by splitting the distribution in Table 8.6 above at the median. Although not strongly significant (Table 8.7), observed values do exceed expected values (shaded) and produce a correlation between vessel wall thickness and temper size. The .076 probability for the table is of the magnitude of <.05 commonly accepted as a lower bound of probability significance.

Table 8.7. Sherd Thickness x Temper Size Cross-Tabulation, Transformed.

Sherd Thickness (mm)		Temper Size (mm)		
		<3.00	>4.00	Total
<7.00	Count	48	16	64
	Expected	43.9	20.1	64.0
>8.00	Count	24	17	41
	Expected	28.1	12.9	41.0
Total	Count	72	33	105
	Expected	72	33	105

Chi-square=3.143, df=1, p=.076; Phi .17.

The general suggestion has been that temper coarsens from the Early to Middle Woodland. Although the frequencies are not impressive (Table 8.8), a subtle shift is evident from fine to coarse temper between the early and late strata.

Table 8.8. Stratigraphy x Temper Size Cross-Tabulation, Transformed.

Strata		Temper Size (mm)		
		>3.00	>4.00	Total
1.20	Count	21	10	31
	Expected	21.3	9.7	31
1.30	Count	2	7	9
	Expected	6.2	2.8	9
2.10	Count	26	13	39
	Expected	26.7	12.3	39
2.20	Count	9	2	11
	Expected	7.5	3.5	11
2.30	Count	14	1	15
	Expected	10.3	4.7	15
Total	Count	72	33	105
	Expected	72	33	105

Chi-square=14.2, df=4, p=.007.

A time trend is also evident in the interior treatment of sherds (Table 8.9). Sherd interiors were plain (n=18), plain to uniformly smoothed (n=35), unsmoothed (n=31), and scraped and/or scraped-smoothed (n=18). Observed values trend from early scraping to smoothing in the later strata.

Table 8.9. Strata x Interior Treatment Cross-Tabulation, Transformed.

Strata		Interior Treatment				
		Scraped	Unsmoothed	Smoothed	Plain	Total
1.20	Count	2	10	15	4	31
	Expected	6.2	9.2	10.3	5.3	31
1.30	Count	3	1	4	1	9
	Expected	1.8	2.7	3.0	1.5	9
2.10	Count	3	12	13	11	39
	Expected	7.8	11.5	13.0	6.7	39
2.20	Count	1	7	2	1	11
	Expected	2.2	3.2	3.7	1.9	11
2.30	Count	12	1	1	1	15
	Expected	3.0	4.4	5.0	2.6	15
Total	Count	21	31	35	18	105
	Expected	21	31	35	18	105

Chi-square=53.451, df=12, p<.0001.

Collapsing the scraped and partially smoothed categories and the partially or completely smoothed categories provides a more valid probability estimate because fewer cells fall below the frequency of 5 threshold considered sufficient to avoid inflation of the chi-square value. The p=.007 supports sufficiently the contention that interior smoothing increases with time (Table 8.10).

Table 8.10. Strata x Interior Treatment Cross-Tabulation, Transformed.

Strata		Interoir Treatment		
		Scraped	**Smoothed**	**Total**
1.20	Count	12	19	31
	Expected	15.4	15.6	31
1.30	Count	4	5	9
	Expected	4.5	4.5	9
2.10	Count	15	24	39
	Expected	19.3	19.7	39
2.20	Count	8	3	11
	Expected	5.4	5.6	11
2.30	Count	13	2	15
	Expected	7.4	7.6	15
Total	Count	52	53	105
	Expected	52	53	105

Chi-square=14.100, df=4, p=.007.

The combined exterior and interior surface treatments and the vessel wall and temper size provide a relatively complete picture of a sherd from the manufacturer's point of view and from our perspective of a sherd as a randomly selected plug from vessel walls. How does the attention paid to these attributes change over time? The combination of variables changing with stratum suggests that multiple traits are shifting over time. The number of sherds from Neuse Levee is insufficient to sustain an analysis of variance, the preferred method of testing such relationships. However, a preliminary estimate of the strength of the relationships between the traits and time can be obtained by a linear regression. Except for exterior surface treatment, all of the variables have been transformed to binary states, or are linear, so the data are appropriate to the technique. Rather than further transforming exterior surface treatment, it can be thought of as a linear progression from net impression (3) toward fine (2) and then coarse (1) fabric impression.

The results of the regression indicate a statistically significant relationship ($p<.0001$) between time and the ceramic characteristics (Table 8.11). The standardized beta coefficients provide a relative sense of the contribution of the variables to change through time. Exterior surface treatment (beta=.45) is the most powerful indicator of change through time, while the temper size (–.14) and sherd thickness (.15) contribute equally small proportions to the change component. Interior treatment is not an important factor in this sample. As the 88 sherds in the analysis are of undetermined relationship to the population of all Woodland sherds, these figures can only be taken to mean that additional research in deeply stratified sites is necessary. The guiding question of that research should be whether the fabric grid of exterior surface treatment become larger over time along with the thickening of vessel walls. Interior surface treatment should also be examined in the context of a larger sample. Clustering with distant Yadkin and Deep Creek-Mount Pleasant materials could also be a useful aspect of the research.

Unlike the Wakefield Creek sherds, which were consistent in firing atmosphere and duration, the Neuse Levee sherds displayed a high variation in color from black to brown and yellow. One sherd (352-101) has half of a mend hole.

Although rim sherds were frequently found in the Neuse Levee assemblage (n=24, see Table 8.3), they were not especially informative. Most of the sherds were far too small to determine vessel form. With one exception, the lips were untreated. One rim sherd (466-101) contained a notched lip (Figure 6.5f). The temper and paste suggest Yadkin type, but the decoration could imply a Uwharrie (ca. A.D. 1000) association (S. Davis, personal communication, 1998). However, its location at 30–40 cmbs in stratum 2 suggests it was out of place or of Yadkin vintage. This was the only sherd in the assemblage that exhibited decoration (i.e., incising, notching, etc.). The exterior surface treatment could be fabric- or net-impressed, largely smoothed away.

Table 8.11. Regression of Exterior Treatment, Interior Treatment, Sherd Thickness, and Temper Size with Strata.

Regression	Unstandardized Coefficients	Standardized Coefficients		T-test	Significance
R=.49	B	Std. Error	Beta		
(Constant)	1.270	.83		1.524	.13
Temper Size	-.131	.10	-.14	-1.376	.17
Sherd Thickness	.136	.09	.15	1.464	.15
Exterior Treatment	.057	.01	.43	3.924	.00
Interior Treatment	-.059	.09	-.07	-.652	.52

ANOVA	Sum of Squares	df	Mean Square	F	Significance
Regression	4.308	4	1.077	6.501	<.0001
Residual	13.752	83	.166		
Total	18.061	87			

The Neuse Levee ceramic assemblage is highly varied, especially when compared to the uniformity found in the three Wakefield sites. The general lack of decoration and other specialized preparation, non-compact nature of the paste, and widespread fabric and net impression generally suggest an early ceramic assemblage rather than late.

NEUSE LEVEE CERAMIC TYPES AND FUNCTIONS

The Neuse Levee ceramics are consistently sand- and/or grit-tempered, and, with the exception of the dozen net-impressed sherds, are fabric-impressed. The assemblage, given its time ranges and characteristics, matches characteristics of the Piedmont Yadkin series. Because of its location in the Fall Line zone, consideration can also be given to the Coastal Plain types. In overview perspective the Neuse Levee sequence seems to follow the Deep Creek–Mount Pleasant sequence rather well. The radiocarbon dated net-impressed Deep Creek vessel from Lake Phelps along with associated Gypsy and Large Triangular points suggests a time of initial ceramic usage in the Fall Line region of about 1000 B.C. Subsequent fabric impression drifting from fine to coarse weave, and a concomitant increase in temper size, could all conform to the Mount Pleasant development. Similar trends have been noted in the Yadkin series with temper increasing in size as vessels shifted from nested bowls to storage pots.

Perhaps the most interesting contrast between Coastal Plain and Piedmont lies in the reported shift to large conical-based cooking vessels in the Coastal Plain. It is worthy of further research that the vessels at Neuse Levee have a great amount of soot, indicating cooking, while almost no sooting was found in the Wakefield Creek ceramics. The possibility has to be entertained that the Piedmont–Coastal Plain distinction between vessels for storage and vessels for cooking can be seen in the 7.2 km area between the broken terrain of Wakefield Creek and the flats surrounding Neuse Levee, or at least that this is the transition zone in which both are present. More broadly based studies with better access to vessel form would be very helpful in this regard. Such a contrast could also be generated locally by a settlement pattern involving permanent residences in broad floodplain areas such as at Neuse Levee and seasonal hunting and fishing camps in nearby broken terrain such as at Wakefield Creek.

A simple examination of the through-time ceramics characteristics can be constructed by plotting a cumulative sum of the ceramic traits against strata. If the ceramics are holding a constant relationship to each other—i.e., a type—the graph will increase at a constant rate. If the combination of traits changes, the graph line will change directions. By scaling all of the traits so that their numbers increase with time, changes in trait combinations will be marked as an inflection in the cumulative pattern. For the summing of traits, interior treatment, thickness, and temper size were scaled as 1 for below the mean and 2 for above. Exterior treatment was scaled as 1=net, 2=fine fabric, and 3=coarse fabric. The cumulative graph shows the expected upward trend (Figure 8.1). The change in pattern of accumulation suggests a change of type at the stratum 1–2 interface, probably the transition from Early Woodland to Middle Woodland. A second change of pattern appears to be developing at about stratum 1.2. This could be a Late Woodland-related pattern developing.

In summary, net impression clearly has its focus around the Chesapeake Bay area during the Early Woodland with a diminishing frequency toward the south. In fact, the lower Neuse River is considered a cultural boundary as early as the Early Woodland (Phelps 1983). Net impression also appears as an important Piedmont decorative technique in the very Late Woodland on the upper Dan River (Davis 1987; Ward 1983). That the net-impressed ware occurs with an Eared Yadkin (ca. 500 B.C.), two Large Triangular, and two Small Triangular points suggests that it is of Early Woodland vintage. It is stratified above a very Early Woodland Gypsy point. Fabric impressions trend from fine fabric, apparently again in the Early Woodland, to coarse in the Late Woodland, as dated by the predominance of Small Triangulars, although a Large Triangular was also found in the plowzone.

NEUSE LEVEE AND WAKEFIELD CREEK SITES COMPARISONS

A comparison of the Neuse Levee ceramics and how they changed over time with those of the Wakefield Creek sites helps establish a relative set of characteristics and attributes between the sites. The attributes established as important over time were factored for all four sites. A binary variable for each site was included in the analysis to identify the characteristics of each site in the overall constellation of relationships. The depth (cmbs) to the bottom of the level in which sherds were located was used as a time indicator. To standardize depths across sites, the depth of each sherd was divided by the lowest depth of a sherd in that site. Sherd thickness, temper size, and exterior color (1=red, 2=brown, 3=yellow) were used to indicate the vessel, paste, and firing attributes of the sherds. Exterior treatment (1=fine fabric, 2=coarse fabric) and interior treatment (1=scraped/unsmoothed, 2=plain, smoothed) were used to indicate the nature of the customary vessel preparations. The analyzed sample was comprised of 257 fabric-impressed sherds. Net-impressed, cord-marked, and unidentifiable sherds were not considered. As was demonstrated above, the assemblage at Neuse Levee trends from earlier, fine fabric impressions to later, coarse marks. A table of these decimeter (1 dm=10 cm) depths with fine and coarse fabric shows that a significant ($p<.0001$) relationship between size of fabric impression and depth exists across all sites (Table 8.12). The subsequent factor analysis (Table 8.13) shows this relationship clearly along with others.

Five component patterns were detected by unrotated principal components analysis (SPSS 8.0). They accounted for 80% of the variance in the fabric-impressed ceramic data. Patterns 4 and 5 load uniquely for vessel exterior color and interior treatment. They bear little or no relationship to the time-space variables, and so indicate nothing about changes in time. Pattern 1 is largely related to Neuse Levee and 31WA1380. It detects a positive correlation between exterior treatment and temper size that is significant (Table 8.14). Pattern 2 shows that sherd thickness and temper size relate differentially to all four sites but not to the depth; i.e., there was differentiation in sherd (vessel?) thickness between sites. Pattern 3 indicates that interior treatment was applied differentially between 31WA1376 and 31WA1390.

Table 8.15 shows K-Means clusters of sherds based on the four vessel description attributes (exterior and interior treatment, sherd thickness, and temper size). Exterior treatment is shown in the table, so the clusters are based on vessel description with exterior surface treatment “riding” on vessel clusters (cF=Coarse Fabric without visible weft, CF=Coarse Fabric with visible weft, FF=Fine Fabric with visible weft, third letter in Figure 6.5 illustration). As would be expected, fine fabric impression (FF, cluster 3) is the backbone of the Neuse Levee ceramic assemblage. Net impression appears as a clearly separated cluster as well (cluster 4) in the early ceramic period.

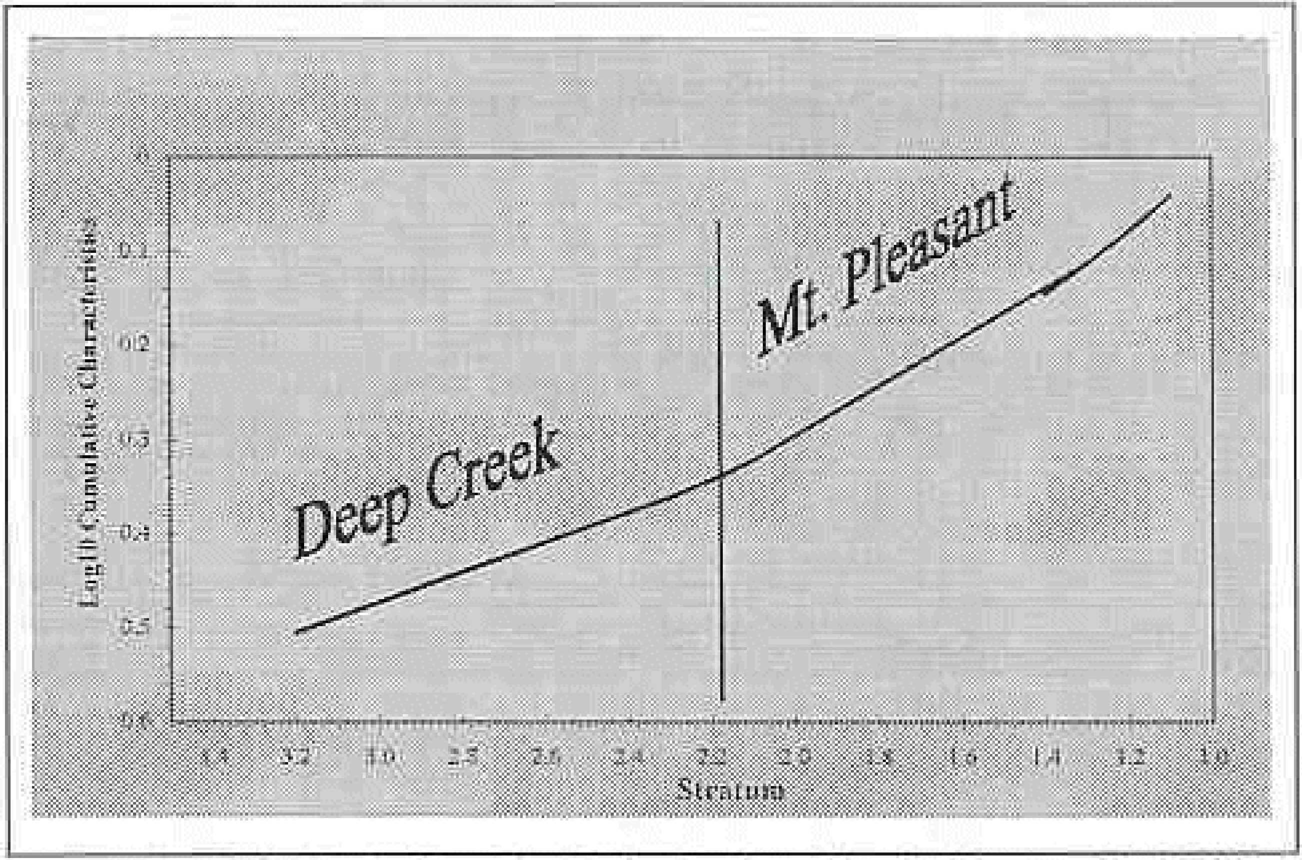

Figure 8.1. Cumulative Trend of Four Sherd Traits (Exterior and Interior Treatment, Sherd Thickness, and Temper Size).

Table 8.12. Exterior Treatment x Depth, Transformed.

Intersite Depth (dm)	Exterior Treatment		
	1.00	**2.00**	**Total**
0.00	3	14	17
1.00		18	18
2.00	4	42	46
3.00		54	54
4.00	17	36	53
5.00	8	14	22
6.00	15	13	28
7.00	2	3	5
8.00	7	2	9
9.00		1	1
10.00	3		3
14.00	1		1
Total	60	197	257

Chi-square=75.5, df=11, p<.0001.

Table 8.13. Components of Neuse Sites Ceramics, Interior and Exterior Treatments, Transformed.

		Component				
		1	**2**	**3**	**4**	**5**
Space	31WA1137	–0.84	0.41			
	31WA 1380	0.88	0.32			
	31WA 1376		–0.54	0.69		–0.31
	31WA 1390		–0.63	–0.60		0.33
Time Level		–0.75		0.20		
Attributes	Maximum Sherd Thickness		0.62			0.22
	Temper Size	0.41	0.65			
	Exterior Color				0.94	
	Interior Treat. (1=smoothed, 2=scraped)			0.59		0.76
	Exterior Treat. (1=fine fabric, 2=coarse fabric)	0.75	–0.32			
Percent of Variance Accounted for		29	20	13	10	9

Table 8.14. Temper Size x Exterior Treatment, Transformed.

Temper		Exterior Treatment		
Size		**1.00**	**2.00**	**Total**
2	Count	5	15	20
	Expected	5	15	20
3	Count	31	54	85
	Expected	20	65	85
4	Count	16	113	129
	Expected	30	99	129
5	Count	8	15	23
	Expected	5	18	23
Total	Count	60	197	257
	Expected	60	197	257

Chi-square=18.525, df=3, $p<.0001$.

Coarse fabric, mostly confined to the upper two levels, provides a more subtle insight into the middle and late ceramic periods. Coarse fabric separates into two clusters (1 and 2) and coarse fabrics with and without weft are not clearly distinguished. Coarse fabric without visible weft appears in both clusters in the upper level, while almost all cases of coarse fabric with visible weft appear in cluster 2 in the second level (two are also in cluster 3). Since there are only four instances of coarse fabric with visible weft in cluster 2, they can only be marked for future reference; two additional cases clustered in 3. However, at least at Neuse Levee, some oscillation between the with- and without-weft varieties of fabric impression may be present. The trend in fabric impression as viewed from the perspective of the Piedmont Late Woodland is that fabric impression becomes finer with time (S. Davis, personal communication, 1998). From the longer term Early, Middle, and Late Woodland perspective of Neuse Levee, fabric begins fine, and a coarse fabric constituent is added in the middle and continues into the late period. Weft tends to drop out from the middle to late periods.

Wakefield Comparisons

The 296 analyzable sherds (larger than 2.0 cm) recovered from all three sites at Wakefield Creek all fit comfortably into the Yadkin series ceramics with no exceptions (Idol 1998). The variability between the three sites and possible temporal and functional implications suggested by this variability is of particular

Table 8.15. K-Means Sherd Clusters.

Cluster Depth	1	2	3	4
20 cm	FF	cF	FF	
	cF	cF	FF	
	cF	cF	FF	
	cF		FF	
	cF		FF	
	cF		FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
30 cm	cFD	CF	CF	
	FF	CF	FF	
	FF	CF	FF	
		cF	FFA	
		CF	FF	
		cF	FF	
		cF	CF	
		cF	FF	
		cF	FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FF	
			FFG	
			FF	
			FF	
			FF	
			FF	
			FF	
40 cm	cF	cFF	FF	N
			FF	N
			FFC	N
			FF	N
			FF	N
			FFE	N
			FF	N
			FF	N
				N
				N
				N
				NB
50 cm			FF	
			FF	
60 cm			FF	

interest here, and how the ceramics from Neuse Levee fit into that variation. The Wakefield and Neuse Levee assemblages are compared to other Yadkin series assemblages (e.g., Anderson 1982; Espenshade 1986; Marshall 1988) and situated within a broader contextual discussion of Early Woodland settlement and subsistence practices in the Southeast.

Interior Surface. Thirty-one sherds (30%) in the Neuse Levee assemblage exhibited evidence of exterior sooting providing ample direct evidence of use of he vessels for cooking. At Wakefield Creek, although indirect evidence for enhanced heating effectiveness (thin walls, especially at 31WA1376 and 31WA1390) and the dominance of plain, roughly smoothed, and more highly smoothed vessel interiors suggest that cooking over direct heat was an important function of vessels, no direct evidence for cooking such as soot deposits on sherds was observed. Temper. Though not of the extremely large size of Cashie ware, some of the Neuse Levee ceramics have large temper, and the size of temper increases over time. Some had very high density of large temper. Similar trends were observed at 31WA1380, and could indicate that larger sized vessels were being used, probably for storage.

The most noticeable distinction between the Wakefield sites is the difference in temper size and wall thickness of the assemblages. Sites 31WA1376 and 31WA1390 are characterized by extremely thin mean wall thicknesses (x=6.60 mm and 6.18 mm respectively) compared to 31WA1380 (x=8.04 mm). Temper size is correspondingly larger at 31WA1380 than at the other two sites and is more frequently angular in shape. More emphasis was given to heating at the lower two sites (31WA1376 and 31WA1390) while storage was of greater concern at the upper site. If such a trend exists, the later, thicker, larger tempered vessels at Neuse Levee imply that storage was important. This is not unreasonable in a site with water transportation immediately available.

Exterior Surface. A breakdown of the general fabric-impressed category into five subcategories shows similar distributions at all three Wakefield sites, except fabric-smoothed, which is somewhat less frequent at 31WA1380. At Neuse Levee rather clear stratigraphic distinctions can be made, with finer impressions appearing early and coarser impression in small proportions coming later. It could be that coarser fabric impressions are desirable on a larger vessel because they provide a coarser and more durable non-slip surface for handling. A fine-to-coarse trend at this time depth would conform to the Piedmont Early Middle Woodland pattern, which is presently understood to change from bowls in the Early Woodland to jars in the Middle Woodland. The trend from fine to coarse contradicts the trend observed in the Late Woodland (S. Davis, personal communications, 1998). However, if the size of the fabric grid is related to creating a non-slip surface on the vessel, as well as roughening the paddle and conforming to cultural style, then changes in fabric would be related to site function and would vary with site function. The Neuse Levee assemblage seems to show an oscillation from fine to coarse and perhaps back to fine. Could this be attributable to multiple changes of function, and thus a full cycle of patterns? A parallel set of changes may be found in the lithics from more sedentary to more mobile indicators in the Late Woodland.

Vessel Form. Apart from what can be inferred about vessel size form temper and wall thickness, little can be said about vessel form at Neuse Levee. It appears that vessels were enlarged over the period of occupation of the site.

SUMMARY

Although typological schemes like the Yadkin, Deep Creek and Mount Pleasant series are admittedly broad (subsuming much localized variation under a common typological umbrella), their inclusiveness is a fairly accurate descriptor in that Early/Middle Woodland cultural systems exhibit a reliance on vessels intended to serve highly generalized (if seasonally specific) food cooking and/or storage requirements. Before the Late Woodland generalized vessels appear to have been the rule, with specialization following in the Late Woodland. The relative homogeneity of ceramic types in the Early/Middle Woodland could be partially attributed to the mobility of groups and the lack of territoriality and/or expression of social affiliations that could be more characteristic of later ceramic traditions. In both the Piedmont and Coastal Plain group mobility arguably remained high throughout the Early Woodland period, and was certainly higher than in the late Middle Woodland to Late Woodland pattern, during which increased reliance on maize horticulture reduced mobility. Ceramic assemblages over most of the North Carolina Piedmont and Coastal Plain regions reflect the range of generalized and locally diverse exploitative economies that existed until the latter part of the Middle Woodland in the Piedmont (A.D. 700–900), when maize agriculture becomes important over much of the Southeast and more localized ceramic traditions emerge.

The Neuse Levee location and ceramic inventory suggests a small camp in the probable context of a larger base camps at other locations. If such exist, they have not yet been identified in spite of rather extensive investigations, including a pipeline survey of the Neuse River Floodplain several miles in either direction from the site (Hargrove 1986). The proximity of the river implies that resident groups were focused on river resources such as fish, possibly supplemented by starchy seed cultigens that included chenopodium or sumpweed. Ceramic vessels could have been used to process fish for oil, storage, or transport. Because of the flat terrain, both aquatic and horticulture resources need to be considered as potential attractions to the site.

The three Wakefield sites' locations and artifact inventories suggest a broad commonality apart from that of the Neuse Levee site. They appear to represent seasonal upland/transitional zone foraging camps or stations. This implies that resident groups were focused on forest resources such as mast, deer, or turkey, again possibly supplemented by starchy seed cultigens that included chenopodium or sumpweed, or riverine resources such as fish. Ceramic vessels could have been used to process large amounts of nuts or acorns or other forest foods for fall/winter storage or transport. Because of the broken terrain, either arboreal or aquatic resources are implied as primary site resources, not horticulture.

The ceramic technology at Neuse Levee has strong elements of stability, reflecting the tendencies of the surrounding Piedmont and Coastal Plain. In those regions, as is becoming increasing apparent, relative continuity reigned, perhaps from the early centuries of the Woodland to contact.

The ceramic technology, largely within the definition of the Yadkin ceramic tradition with crushed quartz temper, always played an important role at Neuse Levee.

Net-impressed ware was found in the lower ceramic strata. Most of it was in a single square, raising questions of whether it is intrusive. However, two other possible net-impressed sherds were found in other squares. This suggests a link to the Coastal Plain during the Early Woodland period.

Fine fabric impression was the dominant mode of exterior treatment throughout the ceramic period. However, coarse fabric became more important with the passage of time. It could reflect mobility in a similar fashion to core-biface flakes (see Chapter 9, lithic analysis), if the grid of the fabric is related to vessel size and transportability.

A slight tendency ($p=.076$) was found for thicker sherds to contain larger temper. This finding supports the hypothesis that temper is preselected for the size of the vessel under construction. A distinct ($p=.007$) pattern of temper increasing in size appears in stratum 1.

Interior smoothing increases with time ($p=.007$). It is not, however, as powerful a component of time as exterior treatment and temper/wall thickness.